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ABSTRACT

The question for educators is no longer how much better do students learn with technology, but how do we integrate technology into our classrooms in a way that benefits students? To study the question of how to encourage instructors to use technology to teach, a survey was used to create connections between teachers' technology attitudes, technology usage, and learning style. Teachers from five elementary schools in a large southern California school district participated in the study. Results suggest that relationships exist among technology attitude, usage outside of work, and usage to teach. Additionally, the descriptive analysis points out differences across age ranges and ethnicity in whether teachers use technology. (Contains 5 tables and 15 references.) (Author/MES)

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Learning Styles, Technology Attitude and Usage: What are the Connections for Teachers and Technology in the Classroom?

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Abstract: . The question for educators is no longer how much better do students learn with technology, but instead how do we integrate technology into our classrooms in a way that benefits students. A specific part of integrating technology into the classroom examines how to encourage teachers to use technology to teach. To study this question, a survey was used to create connections between teachers' technology attitudes, technology usage, and learning style. Teachers from five elementary schools in a large southern California school district participated in the study. Results and implications are discussed.

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Whether people want to embrace technology or not, it is necessary to be able to use it to learn, problem solve, and function on a daily basis with it. Our personal and professional lives are affected increasingly by a variety of technologies. Therefore the question for educators is no longer how much better do students learn with technology, but instead how do we integrate technology into our classrooms in a way that benefits students. A specific part of integrating technology into the classroom examines how to encourage teachers to use technology to teach. Luke, Moore, & Sawyer (1998) write that teachers need to use technology to teach if students are to learn with it. Additionally, Collis (1996) reflects on research conducted worldwide over the past decade and states, "...one type of result consistently occurs; a result that acknowledges the teacher as the key figure in the eventual success or lack of success on any computers-in-education initiative" (p. 21).

To begin understanding how to increase a teacher's technology usage in the classroom, we must learn why teachers choose to use technology. Does a person's technology usage in the world outside of work have any bearing on whether he or she uses technology at work? Is there a connection between someone's attitude and his or her technology usage? Does a person's thinking style matter when he or she considers whether to use technology or how to use it? Are there any relationships among technology usage, attitude toward technology, and thinking style? This paper examines a study that was conducted to address these issues.

Background

The researcher's experiences within the business and teaching worlds allowed informal observation of people who do and do not use technology. Why are some people willing to use technology within their jobs while others resisted? It seems logical that how you learn and how you feel about something affects what you choose to do or use. In the case of technology and teachers, this would imply that attitude towards technology and a person's learning style affect if one uses technological innovations inside the classroom. Also, if a person uses a variety of technological items at home, he or she is probably more likely to use technology to teach in the classroom.

To support these beliefs and perceptions, a literature and research review was conducted to locate studies dealing with technology attitude, technology usage and learning style. There is an abundance of research on computers, technology, and education. Many studies concentrate on attitude toward computers (Knezak & Christensen, 1998; McFarlane, Green, & Hoffman, 1997; Woodrow, 1991), or computer usage and attitude toward technology (Byrd & Koohang, 1989; Levin & Gordon, 1989; Marshall & Bannon, 1986). Fewer studies consider computer usage and thinking or learning style (Knupfer, 1989; Smith, Munday, & Windham, 1995). And, there are no studies that consider all three threads together; technology usage, attitude toward technology, and learning style.

Another issue found while researching these topics, is that it is difficult to find surveys and other research tools that examine the broader concept of technology rather than computers. Until recently, conversations about technology in education meant talking about how to use computers as teaching devices. As new technologies develop faster and faster, we are realizing that "technology" does not equal "computer" and it

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has not for a long time in classrooms. Video recorders, televisions, and satellite dishes have been in schools for quite awhile, yet usually these other pieces of technology are ignored.

A survey was created to try to create connections between technology attitude, technology usage, and learning style. The survey included three scales: the Technology Attitude Scale (TAS) (McFarlane, Green, & Hoffman, 1997), the General Technology Usage Scale (GTUS) (Galowich, 1998) and the Learning Styles Inventory (LSI) (Kolb, 1985). The survey is an initial attempt to collect data from teachers about their respective attitudes toward technology, technology usage outside of the classroom, and learning style and explore the connections among these variables.

Description of Survey and Sample

The survey instrument was constructed to examine teachers' attitude toward technology, technology usage outside of work, and learning style. As already mentioned, there were many computer attitude scales but only a few technology attitude scales. Of these few scales, only one, the Technology Attitude Scale (TAS) was up-to-date when considering current technological advances. An additional benefit is that the scale was created to use with teachers. The TAS was used to assess attitude toward technology for this survey.

A few research studies examined technology usage in work settings but none of them examined technology usage outside of work situations, therefore a scale was created. In an effort to create a scale, the researcher began listing all types of technology that people encounter in their daily lives. To capture a range of technology usage common technological items (e.g., sewing machine, television, stereo, and microwave) were included, as well as more unusual technological items (e.g., digital video disk [DVD], scanner, and electronic datebook/organizer). The original list had approximately 40 technology items found in households or non-work environments. The list was narrowed down to 20 items to make it a more acceptable length and to avoid score inflation due to including too many common technological innovations. The final scale was measured with a six point frequency scale that was used to assess usage patterns (an example item: I use a cordless phone... 1=never, 2=rarely, 3=several times a year, 4=at least once a month, 5=at least once a week, 6=daily). Additionally, a question was included to determine if a teacher uses technology to teach in the classroom. These 20 usage questions compose the General Technology Usage Scale (GTUS).

The final scale included in the survey needed to provide a way to assess cognitive learning or thinking style. Previous research (Knupfer, 1989; Smith et al, 1995) examining thinking/learning style and technology attitude used the Myers-Briggs Type Indicator (Myers & Briggs 1976) scale but this is a personality type preference, not a learning or thinking type. David Kolb (1976, 1985) created the Learning Style Inventory (LSI) to assess learning styles based within the Jungian idea that styles represent different modes of learning and people use all modes with the predominant one being the designated "style" or "type". The four styles are Accomodator, Diverger, Converger, and Assimilator. The styles are created based on a preference for learning actively versus reflectively and in an abstract versus concrete way. The 1985 revised scale was used for this study.

A large school district in southern California agreed to have teachers from five schools participate in the study. Surveys (with an attached, stamped envelope) were given to principals to pass out to their teachers. Of the 120 surveys given to the principals, 79 were returned and 74 were used for statistical analysis. Both the TAS and GTUS included a definition of what should be considered as technology, "For this survey, technology is defined as materials such as computers, VCRs (video recorders), televisions, radio/tape cassette players, laser discs, printers, scanners, microwaves, etc.".

Data Analysis and Results

Description of Sample

Each teacher was asked to pick the appropriate age range for his or her age. The ranges were 20-29 years old (n=26), 30-39 years old (n=22), 40-49 years old (n=10), 50-59 years old (n=12), and 60 or over (n=1). The ethnicity/racial identity of the sample is split mainly between Hispanic American/Latino/Chicano teachers (n=29) and European American/White teachers (n=32); with 1 teacher identifying him or herself as Asian American/Asian; three teachers identifying themselves as Multiracial/Multiethnic and three teachers identifying themselves as "Other".

Using Technology to Teach

The question, "How often do you use technology to teach in the classroom?", that was used to ascertain whether teachers use technology to teach in the classroom is a categorical variable with six choices (See Fig. 1). Yet, the statistical tests are run according to whether teachers use technology to teach in the classroom or not. So, the original variable was recoded to create a dichotomous (yes/no) variable, "How often do you use technology to teach in the classroom?" as shown in Fig. 1. The decision was made to make the cut off point at 5 hours per week for the response "no". Many teachers may use an overhead, VCR, tape recorder, etc., to present lessons throughout a week, yet not really using the technology as an active part of their teaching. So, it is necessary to include a small amount of use in the "no" response category.

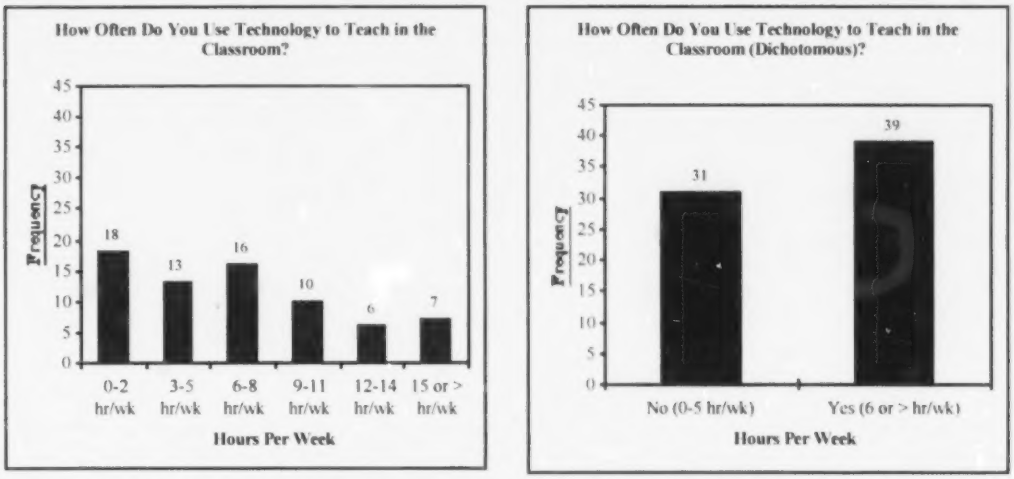

Figure 1. Teacher Use of Technology to Teach, Original Variable and Dichotomous Variable Frequencies

Crosstabs were run to allow comparisons of whether teachers of different ages and ethnicity use technology to teach. First, technology usage and age were examined. More teachers use technology to teach than do not across each age range (20-29, no=7, yes=15; 40-49, no=2, yes=5; 50-59, no=4, yes=7) except for the age range 30-39 where the opposite occurred (no=13, yes=8). The next crosstab displayed ethnicity and whether teachers use technology to teach. More Hispanic American/Latino/Chicano teachers use technology to teach (n=21) than do not (n=8), while less European American/White teachers use technology to teach (n=12) than do not (n=17). Something more interesting to consider is the crosstab that displays age, ethnicity, and teachers who use technology to teach as shown in Tab. 1. The Asian American/Asian, Multiracial/Multiethnic, and Other ethnicity categories along with the age range 40-49 category were not included in the table because each category had a sample of five or less. The trend in this sample is that more Hispanic American/Latino/Chicano teachers in each age range use technology to teach than do not while less European American/White teachers in each age range use technology to teach than do not.

Age	Ethnicity	Do You Use Technology to Teach?	
		NO	YES
20-29	Hispanic American/Latino/Chicano	2	11
	European American/White	5	4
30-39	Hispanic American/Latino/Chicano	4	6
	European American/White	7	2
50-59	Hispanic American/Latino/Chicano	1	2
	European American/White	3	5

Table 1. Crosstab for Ethnicity by Do You Use Technology to Teach Across Selected Age Ranges

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Learning Style

The final score for the LSI allows one to categorize each teacher's responses to the 12 items into one "style". The learning style frequency indicated there were 20 teachers classified as Accomodators, 10 teachers as Divergers, 12 teachers as Convergers, and 12 teachers as Assimilators. It is more interesting to examine the LSI when age and ethnicity are considered. A crosstab, as shown in Tab. 2, was created to examine trends across age and ethnicity for learning style. The Hispanic American/Latino/Chicano 20-39 year old teachers tend to be Accomodators (n=9) but Assimilators (n=5) and Divergers (n=4) are represented in this sample as well. European American/White 50-59 year old teachers were all classified as Accomodators (n=5). Finally the 30-39 year old European American/White teachers were evenly split across all four styles (n=2 for each).

Age	Ethnicity	Learning Style			
		Accomodator	Diverger	Converger	Assimilator
20-29	Hispanic/American/Latino/ Chicano	5	2	1	2
	European American/White	2	0	3	1
30-39	Hispanic/American/Latino/ Chicano	4	2	1	3
	European American/White	2	2	2	2
50-59	Hispanic/American/Latino/ Chicano	0	1	1	1
	European American/White	5	0	0	0

Table 2. Crosstab for Ethnicity by Learning Style Across Selected Age Ranges

Learning Style and Using Technology to Teach

Finally as shown in Tab. 3, a crosstab was run to examine if there is a relationship between learning style and whether or not teachers use technology to teach. For all learning styles except Accomodator, there were about as many teachers who use technology to teach as those who do not except for the Accomodator style. Even with the slight difference among Accomodators, there are no significant differences (a chi-square was calculated to test significance) when examining each learning style and whether or not a teacher uses technology to teach. This trend continues when correlations and t-tests are run.

Learning Style	Do You Use Technology to Teach?	
	NO	YES
Accomodator	8	12
Diverger	5	4
Converger	6	6
Assimilator	5	6

Table 3. Learning Style by Do You Use Technology to Teach Crosstab

Correlations and T-tests

The learning style could not be used for statistical analysis because one style is not better than another one. However, the styles are determined by deriving "scores" on two continuous scales. These two scales are the Abstract Conceptualization-Concrete Experience scale and the Active Experimental-Reflective Observation scale. So, LSI1 represents the Abstract Conceptualization-Concrete Experience scale while LSI2 represents the Active Experimentation-Reflective Observation scale. Variables included in the correlation were TAS total score, GTUS total score, LSI1, LSI2, and how often technology is used to teach in the classroom (TECTEACH). Due to a low response rate on the LSI (some subjects filled out this scale incorrectly while others chose not to complete it at all), correlations with one of the two LSI variables had n=52 or 54. Other correlations had n=70, 74, or 75.

There were two significant correlations (see Tab. 4) both involving how often technology is used to teach in classroom. The relationship between technology usage outside of work and technology usage to teach in the classroom is moderate. Attitude toward technology and use of technology to teach in the classroom has a slightly stronger relationship than the GTUS/TECTEACH correlation. Interestingly, there was not a significant correlation between the TAS and GTUS total scores (r=.203, p=.084, n=74). Neither LSI variables had significant correlations with any of the other variables.

Variables in Correlation	r	p	n
GTUS/TECTEACH	.293	.014*	70
TAS/TECTEACH	.376	.001**	70

*p<.05, **p<.01

Table 4. Significant Correlations for Technology Survey

To examine if there were differences between teachers who use technology to teach and those who do not, t-tests were performed. Of the four T-tests run (TAS, GTUS, LSI1, and LSI2), TAS and GTUS had significant results as shown in Tab. 5. So, while learning style did not vary significantly between teachers who use technology and those who do not, technology attitude and usage outside of work did.

Variable	t	p	df
GTUS Total	-2.208	.031*	68
TAS Total	-2.851	.006**	68

*p<.05, **p<.01, Grouping Variable: Do you use technology to teach?

Table 5. T-test results for GTUS and TAS

Implications

From the correlation analysis, we know a teacher's use of technology to teach in the classroom is more likely to be higher when his or her attitude (separate from usage) and technology usage outside of work (separate from attitude) are higher. Yet, in this study there was no significant relationship between technology attitude and usage of technology outside of work. This relationship needs to be studied further to determine if there might be an interrelationship between attitude and outside usage when using a larger, more diverse sample.

In addition to the significant correlations found in the study, there were significant differences between teachers that use technology to teach and those who do not, in their technology attitude and technology usage. This seems to make sense since the more experience one has with something, the more comfortable one feels in using it in a variety of situations. The question becomes which variable(s) causes the other(s). More research with a larger, more diverse sample needs to be conducted to see if these relationships continue to exist and if the direction of the relationship can be determined.

With this sample, there was not a statistically significant relationship between attitude and usage outside of work. Also, there are no relationships or significant differences between groups of teachers with learning style. In both instances, low sample size, the sample itself, and/or no relevance may be why there were no significant findings. To find out if these results (both the significant and non-significant) are accurate, more research must be conducted with this survey.

Contemplating what the data analysis means to the questions posed in the beginning of the paper, it seems there is a relationship between a person's technology usage outside of work and whether or not a teacher uses technology to teach in the classroom. Likewise, there is a relationship between technology attitude and whether or not a teacher uses technology to teach in the classroom. Whether there are interrelationships between technology attitude, usage, and learning style was unable to be determined. Future research must include statistical analysis that produces a MANOVA, multiple regression, or other similar analysis techniques to determine interrelationships among the dependent variables, as well as to examine the unique contributions each variable may make to explain or predict whether teachers use technology to teach.

The results of this study suggest the possibility that relationships exist across technology attitude, usage outside of work, as well as usage to teach. Additionally, the descriptive analysis points out differences

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across age ranges and ethnicity in whether teachers use technology. Further research must be done to explore how strong these relationships and trends are and whether attitude and usage can help predict a teacher's usage of technology to teach. This is important to find out because if we can figure out why teachers are inclined to use technology to teach, then we can try to create technology training programs that foster teachers' positive attitudes and usage. Additionally if there are correlations with learning styles, we can better tailor these training programs to meet the needs of different types of learners.

References

Byrd, D. M. & Koohang, A. A. (1989). A professional development question: Is computer experience associated with subjects' attitudes toward the perceived usefulness of computers? Journal of Research on Computing in Education 21(4) 401-410.

Collis, B. (1996). The internet as an educational innovation: Lessons from experience with computer implementation. Educational Technology 36(6), .21-30.

Galowich, P. M. (1998) General Technology Usage Scale. Unpublished survey.

Knezak, G., & Christensen, R. (1998) Survey of teachers' attitudes toward information technology. Survey presented at the Society for Information Technology & Teacher Education International Conference. Washington, D. C..

Knupfer, N. N. (1989). The relationship between elementary teachers' psychological types and their uses of educational computing. (ERIC Document Reproduction No. ED308 824).

Kolb,. D. A. (1976). Learning Style Inventory. Boston: McBer and Company.

Kolb, D. A. (1985) Learning Style Inventory, 1985. Boston: McBer and Company.

Luke, N., Moore, J. L., & Sawyer, S. B. (1998). Authentic approaches to encourage technology using teachers. Society for Information Technology and Teacher Education International, 1998. [On-line] Association for the Advancement of Computing in Education, Charlottesville, VA. Available: World Wide Web: http://www.coe.uh.edu/insite/elec_pub/HTML1998/cp_luke.htm

Levin, T & Gordon, C. (1989). Effect of gender and computer experience on attitudes toward computers. Journal of Educational Computing Research 5(1) 69-88.

Marshall, J. C. & Bannon, S. H. (1986). Computer attitudes and computer knowledge of students and educators. Association for Educational Data Systems (AEDS) Summer, 270-286.

McFarlane, T. A., Green, K. E., & Hoffman, E. R. (1997a). Teachers' attitudes toward technology: Psychometric evaluation of the technology attitude survey. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.

McFarlane, T. A., Green, K. E., & Hoffman, E. R. (1997b) Technology Attitude Survey. Unpublished survey.

Myers, K. C. & Briggs, I. (1976) Myers-Briggs Type Indicator. Palo Alto, CA: Consulting Psychologists Press.

Smith, B., Munday, R., & Windham, R. (1995). Prediction of teachers' use of technology based on personality type. Journal of Instructional Psychology 22(3) 281-285.

Woodrow, J. E. J. (1991). A comparison of four computer attitude scales. Journal of Educational Computing Research 7(2) 165-167.

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